GUIDELINES FOR REDUCING BIRD AND BAT IMPACTS FROM WIND DEVELOPMENT IN CALIFORNIA

STAFF WORKSHOP #2 SUMMARY
AUGUST 28-29, 2006

Monday, August 28, 2006

I. Introductions, Workshop Objectives and Agenda Review

Rick York of the California Energy Commission (CEC) Biology Unit welcomed all participants and provided a brief overview of housekeeping items. Facilitator Paul De Morgan of RESOLVE then initiated a round of introductions, and reviewed the agenda, meeting documents and objectives for the two-day workshop. It was noted that the language for agenda topics originally included in the notification process changed from pre-construction and post-construction monitoring to pre-permitting and operations monitoring respectively.

The group was reminded that the deadline for written comments related to this workshop is September 8. All stakeholders were also encouraged to submit agenda topic suggestions for the next Staff Workshop by September 15.

II. Updates Since Last Workshop

Misa Ward of CEC's Siting Division informed the group that the Commission had received a letter from stakeholders requesting increased opportunities for collaborative stakeholder involvement. The Commission appreciated the suggestions and modified the process accordingly. Both the stakeholder letter and Commission response are posted on the CEC website (http://www.energy.ca.gov/renewables/06-OII-1). Ms. Ward then provided an overview of the process modifications as follows:

- Shifts in timing provide more time for stakeholders to affect various drafts of the guidelines; revisions will be based on comments received both in written form and from Staff Workshop discussions.
- The number of public events will increase to seven; three occurring after the release of the *Draft Guidelines*.
- Science Advisory Committee (SAC) involvement will be increased by integrating them into Staff Workshops as speakers. CEC would appreciate stakeholder suggestions for SAC presentation topics.
- Locations of future Staff Workshops are moving to major wind areas to encourage county/city staff attendance.

The following reflects revisions to the schedule for development of the guidelines:

- Late-September – Staff Workshop #3 will be located near Tehachapi. CEC is still seeking to confirm a venue and welcomes suggestions. The focus of the agenda will be on impacts and mitigation.
- Mid-late October – First public release of the *Draft Guidelines*.
- Early November – Staff Workshop #4 located near San Gorgonio area.

- Late December – Renewables Committee Workshop (chaired by the Commissioners) located near Bay Area/Altamont. *Draft Final Guidelines* will be released in advance.
- Early February – Committee Hearing in Sacramento to review *Final Guidelines*.
- Mid-February – Business meeting for adoption of *Final Guidelines*.

Nancy Rader of CalWEA asked if CEC staff were drafting the guidelines jointly with California Department of Fish and Game (CDFG). Ms. Ward replied that both CEC and CDFG are contributing to the drafting with SAC conducting concurrent review.

Kelly Birkinshaw of the CEC Public Interest Energy Research (PIER) program provided a research update presentation[1]. He informed the group that wildlife interactions with energy facilities fits within PIER's program, and that his talk would focus on the scope of PIER research with respect to the guidelines; highlighting opportunities for stakeholder input. An outline of his talk follows:

- PIER-EA Research Provides Information to Help Guide Policy
  - Research coordinated but independent of guideline development
  - Policy analysis and research operate under vastly different timelines
  - Research results will be valuable for future revisions/updates
- R&D Committee Allocated $1M Program for 2006/07
  - Goal is to inform wind siting/permitting guideline policy and stakeholders.
  - Objectives are to facilitate appropriate siting of wind development, improve methods and metrics and assess effectiveness of mitigation measures
- Key Questions
  - What is the threshold of bird use and behavior that triggers a problem?
  - How well does pre-construction analysis predict post construction impacts?
  - What mitigation could be effective and how do we measure success?
- Potential Areas of Research
  - What are the optimal distances and time intervals for assessing bird use and behavior?
    - Can observations be improved with instrumentation?
    - What are the tradeoffs between cost and accuracy/precision
  - How can we improve upon estimating impacts?
    - What are optimal search intervals, scavenger detection protocols, monitoring duration?
  - What are the best methods and instruments for detecting nocturnal activity?
- Roadmap objectives:
  - Provide forum for stakeholders to participate in framing research agenda
  - Relative to selected issues, identify gaps in ongoing research
  - Facilitate collaborations with other research institutions, agencies, and operators
  - Define short, mid, and long-term goals, timeframes, budgets, and activities
  - Balance timeframes, risk, and provide the greatest public benefit
- Proposed timeline for developing roadmap
  - Current: Staff engaged in guideline development, reviewing literature, consulting experts.
  - September: Prepare draft list of research needs and distribute
  - October: Scoping Workshop to discuss, add, delete, and prioritize needs

[1] A copy of the presentation can be found on the CEC website at http://www.energy.ca.gov/renewables/06-OII-1.

- January: Release Draft Roadmap
- February: Workshop
- March: Final Roadmap
- 3rd Q 07: Begin Research

Mr. Birkinshaw noted that typical research programs have longer time horizons for studies requiring field work; on the order of years rather than months. The policy analysis for this process will result in a final product this February, indicating research results will be more valuable in future applications/revisions of guidelines rather than the initial drafting phase. Mr. Birkinshaw clarified that CEC is relying on expert judgment for the development of the guidelines rather than conducting studies due to the limited timeline. The question was raised of whether or not a guideline revision process has been designed to take advantage of research conducted in the future. Ms. Ward replied that a session would be dedicated to this topic at the next Staff Workshop.

III. California Wind Overview Presentations

A. State of Wind in California – *Brenda LeMay, Horizon Wind Energy*

Ms. LeMay noted she would be addressing what happens at the front end of the wind siting and development process rather than speaking about the later stages associated with construction and monitoring. Ms. LeMay presented a map of California with a series of overlays depicting the following:

- Areas that meet the threshold for wind development.
- Military zones/areas and (military-issued) height restricted areas.
- National parks, wilderness areas and critical habitat.

She indicated that, when viewed together, the final map shows very few sites, scattered, are available. A participant asked if similar analyses have been done for regions across the border. Carl Zichella of the Sierra Club responded that he believes colleagues have done similar analyses for Mexico and Nevada and noted that information for additional locations may be available. Kenny Stein of FPL Energy added that military no-fly zones are extensive, making wind development in Nevada very difficult.

B. Project Development Process – *Kenny Stein, FPL Energy*

Mr. Stein began his presentation by stating his intent was to identify all the issues beyond birds and bats that wind developers need to consider and address in order to start a project (see Figures 1. and 2. for details). He suggested that when the pre-permitting time period is extended the entire wind development process can be delayed.

Figure 1.

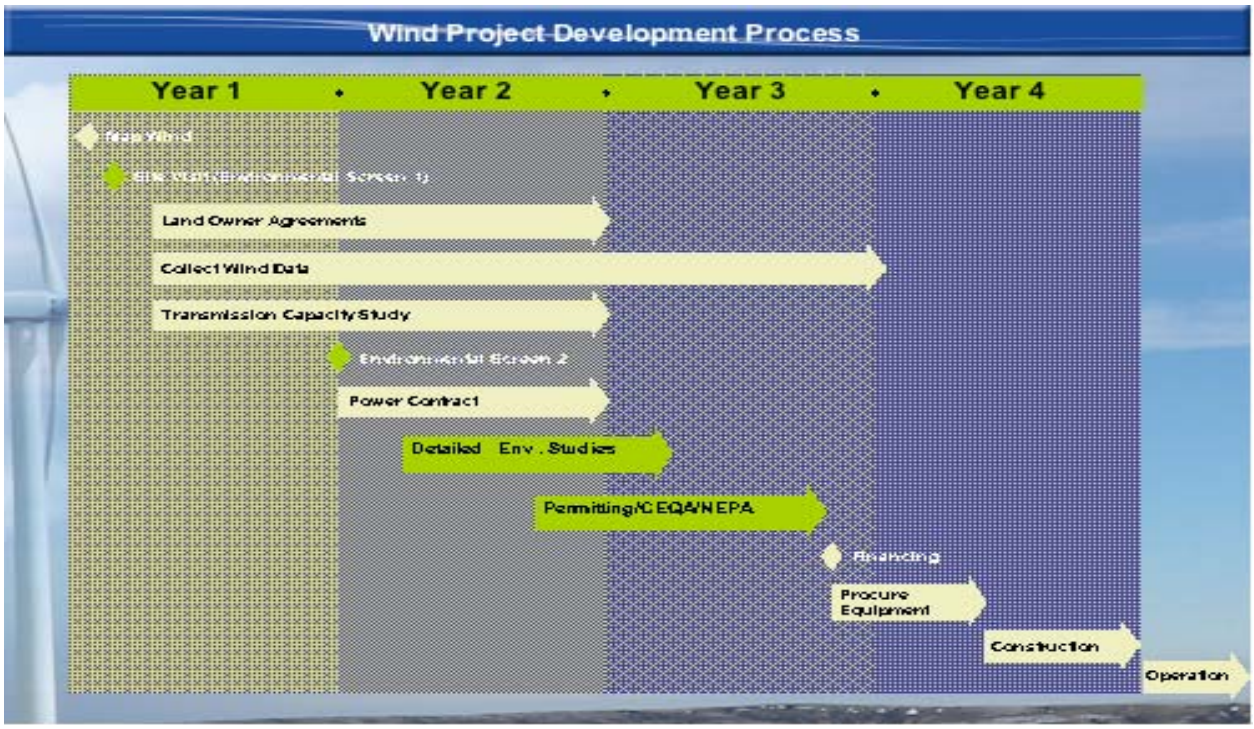
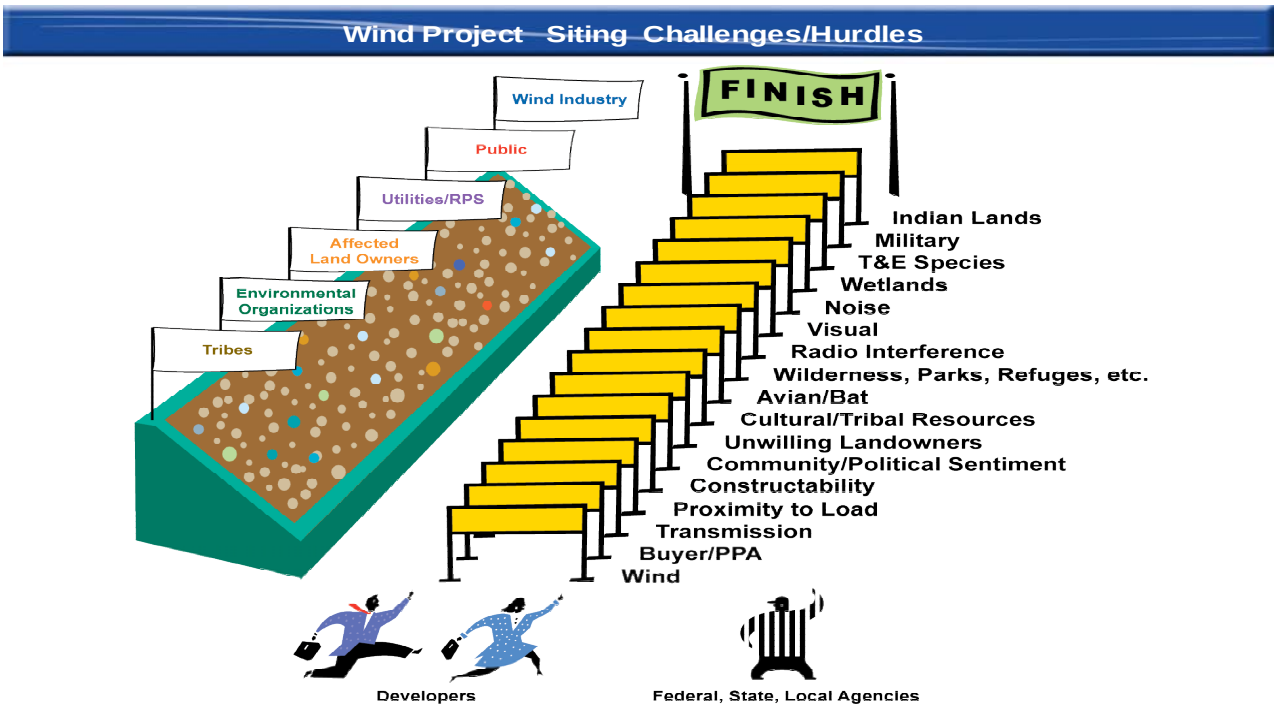


Figure 2.



In response to an inquiry, Mr. Stein informed the group that wind development budgets can range from one million to a few million dollars. Considering that several hundred thousand dollars can be spent on studies, research can end up as one third of all costs. Julia Levin of the Audubon Society asked if existing data were available, where in the process it would be considered. Mr. Stein replied that it would play into the *Environmental Screen 2* in Year 2. Ms. Levin then inquired if more existing data were available could it be used in the first environmental screen in Year 1 and if so, how much would that help. Mr. Stein replied he thought it could help tremendously if: 1) it did not present a cost to developers during *Environmental Screen 2* and 2) it could possibly supplement more detailed environmental studies. He cautioned that even if more data were available, the entire process would still take three to five years because a project will not go forward until the second year when all the other elements (e.g., land owner agreements, wind data collection and transmission capacity) are in place. Additionally, even if permitting was started earlier in the CEQA/NEPA process, assessing the footprint of a proposed project will be a big part of the overall process and may still take more time.

Andy Linehan of PPM Energy posited that the use of existing data to shorten the permitting process would be a good theme to work on in developing the guidelines. Currently, some stakeholders are not confident that the existing mortality studies conducted in the San Gorgonio Pass in Riverside County are adequate to demonstrate low avian use and mortality in that wind resource area. It would be helpful if the guidelines would support that existing data (for example the data for San Gorgonio) is valid, and thus that there could be less additional data required for existing wind resource areas. He suggested it would be helpful to determine how existing data could be used in a general way within the guidelines so it could be deemed useful at a multitude of sites. Ms. LeMay suggested that you may want to consider what the data says; if the results are not good, developers will walk away earlier.

In response to a question regarding whether or not the timeline could be revised, Mr. Stein commented that every project is different. Overall, the best change would be to start the permitting process sooner given sufficient confidence in the quality of existing data to make determinations. Ms. LeMay added a reminder that landowner agreements are needed before applying for permits, and that a great deal of research is conducted seasonally which may affect the overall timing of the development process. Regardless, the more information that is available earlier, the better.

IV. Pre-Permitting Diurnal Bird Monitoring:

A. Presentation – *Dick Anderson*[2]

Dick Anderson prefaced his presentation by stating his intention to provide fuel for discussion rather than hard and fast answers. Following is an overview of his presentation:

- Standard (Default) Pre-Permitting Methodology and Study Design
  - Duration
  - Frequency
  - Intensity
  - Metrics
  - To be modified as new information becomes available

[2] A copy of the presentation can be found on the CEC website at http://www.energy.ca.gov/renewables/06-OII-1.

- Standard Bird Use Count Duration
  - One year of bird use counts spanning all seasons
  - Four breeding bird surveys during appropriate time(s) of year
  - One or more raptor nest surveys during appropriate time(s) of the year
- Standard Bird Use Count Frequency
  - Conduct bird use counts at a minimum of one hour per week at each observation point
  - This can be increased for migration or nesting seasons or other special interest periods
  - Vary time of counts throughout the day at each count site
- Standard Bird Use Count Intensity
  - Small developments (1-10 turbines) --one observation point per turbine up to ten
  - Moderate sized developments (11-40 turbines) --10 observation points or 40% of turbine number whichever is greater
  - Large development (41turbines and larger) --16 observation points or 30 % of turbine number whichever is greater
  - Cover whole area where turbines will be placed
  - Breeding Bird count sites should be located every 200 meters in turbine location area
  - Overlay a grid for observation point selection if turbines sites/locations are not known
  - At least one raptor nest survey covering at a minimum three miles from the perimeter of turbine locations
- Standard Bird Use Count Method
  - Bird Use Counts are an index to relative abundance and bird use during a defined time and area. Point count type methods are used and count sites are normally chosen at turbine locations or nearby at good observation points. The observer documents bird behavior, distance to bird, height of bird off ground and length of time the bird is in the plot.
- Standard Metrics
  - Bird use is the number of birds detected utilizing a defined area during a defined time period (5-60 minutes).

    One formula for Bird Use is:

    No. birds observed = Bird Use
    Time or Time and Area

    Raptors per minute
    Birds per minute in rotor swept risk area
    Birds per minute within 50 meters

- Less than Standard Studies:
  - Must be defensible
  - Recent (five years or less) nearby credible and applicable studies available
  - Infilling at well studied site with adequate information
  - No sensitive bird species nor concern--adequate information
- More than Standard Studies:
  - Must be defensible

  - Areas with high raptor use
  - Moderate to large project at greenfield (undeveloped) site with little knowledge of site bird resources
  - First development in what will become a large WRA
  - Special species and /or special situation (near wildlife refuge, daily flight corridor)
- Special Cases
  - Concern regarding natural fatality levels---conduct one year of Carcass Searches during pre-permitting. A BACI sample design is preferred.
  - Concern regarding carcass search frequency needed for operations monitoring---conduct Carcass Removal studies during pre-permitting
  - Sensitive species or special situation concerns can lead to special pre-permitting studies---such as a feeding corridor for sand hill cranes or bald eagle use of an area or annual variation
  - Long-term information needed such as breeding density changes, population changes or displacement of use by a target species
  - Tools such as mist netting, bird transects, point counts, or a combination of these may be needed for one or multiple years.
- Objective of standardization is to develop metrics and methods which promote consistency and allow comparison between avian field studies relating to wind energy deployment.
- Standardization
  - Always do a standard study and develop standard metrics
  - Additional studies can be conducted to supplement the standard studies---such as mist netting, using greater effort during migration time, and other methods and tools as defensible and needed
  - Needed for better estimates of impacts
  - Meta-analysis is needed to improve estimates
- Benefits of Standardization
  - To promote the responsible permitting and development of wind plants.
  - To provide a reference to assess the suitability of a proposed wind plant site and assess the effects of a wind plant project on all bird resources.
  - To provide sufficiently detailed and clearly understandable methods, measurements and definitions.
  - To promote efficient, consistent, cost-effective methods which will produce comparable data.
- In a Perfect World
  - Thresholds/Limits Established (Speed Limits)
  - Standard Methods and Metrics Adopted by all
  - Thresholds/Limits Endorsed and Used by all (No Speeding)

Mark Sinclair of the Clean Energy States Alliance inquired if the recommendations for daytime studies were based on existing metrics (such as the National Wind Coordinating Committee (NWCC) studies/metrics). Mr. Anderson replied that they are based on what often takes place now; in some cases is appears to be sufficient, some not. Overall it seems to be reasonable as a standard, although adjustments can be made either way depending on specific situations.

Mr. De Morgan reminded the group that CEC was looking for a full range of opinions from diverse stakeholder groups and that it may not be possible to cover everything today. He noted that further

opportunities for public input exist in providing written comments (in response to the workshop questions) as well as within the review of the draft guidelines upon public release. The group's attention was then turned to the following discussion items.

B. Discussion Items

1. *Should the guidelines recommend a "standard" (default) pre-permitting study effort? What should the duration, intensity, and frequency be?*
2. *When/why is study beyond the "standard" (default) study effort needed?*
3. *When/why is less study than the "standard" (default) study effort needed?*

Mr. Zichella expressed his support for a standard(s) that generally applies to all sites with variations based on site-specific needs. He wondered if the counties/cities could be incentivised or penalized to ensure the guidelines are used and protocols are followed. Peter Bloom, a biological consultant and member of the SAC, noted that USFWS established guidelines which do not allow much room for deviation from a minimum standard; everyone does the same thing, regardless of the scale of the project. There is clear acceptance of the benefit(s) from standardization as it imparts predictability for cost.

Mr. Linehan added that Washington State guidelines have similar minimum standards, with an understanding that endangered/sensitive species require a greater investment in research. In his opinion, known impacts from existing projects (e.g., mortality data) could inform new projects where appropriate rather than re-doing studies. Mr. Bloom concurred with the caveat that pre-existing data would need to be universally accepted as solid data (which needs to be defined).

Mr. Stein commented that if counties apply the guidelines equally among project applicants in wind resource areas within the scope of their jurisdiction the hope would be that counties could help level the playing field by requiring the same investments in research from all applicants. Additionally, if acceptable data exists in a developed area and a new development is essentially the same, the minimum standard pre-permitting study effort should not be applied if there is sufficient confidence in the relative risk for mortality. He added it would be nice if the guidelines could specifically address the potential for this to occur. Ms. Levin suggested considering different models based on regions (e.g., Altamont/greater Bay Area) or sensitivity of bird species present in an area, as a one-size-fits-all standard will not work. Mr. Linehan suggested that vegetative cover (or habitat types), topography, and proximity to water bodies are a few examples of features that could be compared to assess site similarities.

Regarding the use of existing data from near-by sites to inform the extent of pre-permitting research conducted at a new site, Ms. Levin suggested that wildlife agencies should be involved in decision making to provide expertise in determining if existing data is sufficient. Dick Anderson suggested that an advisory group could be established to inform decision making; including the permitting agency, CDFG, and USFWS if appropriate. An advisory group could be established by county or by project and could also include interested stakeholders.

Ms. Rader added that existing data needs to provide scientifically-defensible evidence to preclude additional studies. Although the guidelines are intended to be voluntary, CalWEA believes they will

become de facto obligations and therefore should include an option(s) for scientifically-based decision making regarding the need to implement a standard study effort.

Mr. Zichella proposed that PIER could identify research gaps and help inform the process as we go along. He added revisions of the guidelines will be an iterative process over a period of years, and we do not have the luxury of waiting for this new information.

Regarding suggestions for research methodologies, Mr. Linehan proposed the following:

- Look to those used in Washington State for examples of methodologies that have been tried elsewhere and thus provide results that could be compared to results from monitoring using similar methodologies in California.
- 20-minute point counts cost much less than one-hour counts and reduce the potential of re-counting the same birds (that is, a 20 minute-count cannot be directly compared to one-third the results of one-hour point counts); 20-minute counts are by far the most commonly used around the country for wind project pre-construction surveys, and using the 20-minute format would allow comparison to other regions.
- Raptor nest monitoring should be limited to a one- or two-mile buffer of the overall project area, as costs increase significantly when you extend the area to more than a two-mile buffer around the project perimeter.

Mr. Bloom noted that such a standard minimum for perimeter monitoring would have to be extended to three miles if golden eagles were present given the extent of their ranges. He also commented that a 20-minute point count would not be effective for studying golden eagles either.

With respect to standards for pre-permitting study duration, intensity and frequency, Mr. Bloom commented that to account for peaks and drops in bird cycles a duration of five-years would be sufficient for all medium-large birds of prey. If not five, then multiple years (if only three) would be very helpful. Mr. Stein agreed that the more years of data available the better but requested the group consider what is realistic. If studies were conducted for three to five years before starting the permitting process it would result in a 10-year process overall. Mr. Bloom asked why studies could not start at the same time as wind data collection. Mr. Stein replied that at that time a developer would have only negotiated for access to a small parcel of land, but there would not be any certainty of full access to the rest of the land. Also if wind data indicated the site was unfavorable, the money invested in studies would be wasted because the project would not be viable. In response to a question regarding how often a site is ruled as not viable, Mr. Stein replied nine out of ten times.

Ms. Levin proposed that the duration of studies could be extended beyond the endpoint of the CEQA process to accurately complete the record. These discussions highlight the need to start research sooner; while there is a need for landowner permission, this should not be a limiting factor if results are scientifically important. Financial penalties associated with Endangered Species takings could be offset by an investment in studies in advance to avoid takings in the first place. Mr. Anderson added that the guidelines could provide for a decision point to determine if additional studies are needed; triggered only if the 'speed limit is broken'.

4. *Which pre-permitting study methods provide the best value in terms of effort expended and birds saved? Should studies focus mostly on these kinds of cost-effective methods?*

Mr. Vercruyssen suggested the effort expended in conducting studies should correlate with the value added in protection of birds. Cyclical patterns in bird populations in southern California may indicate a need for establishment of a mitigation fund to support research. The guidelines could encourage expanding research to understand such cycles and to inform other studies conducted in the future.

It was noted that the topic of whether or not CDFG would allow funds for mitigation to be invested in a research fund arose at the previous workshop. Mr. Stein stated that in his experience CDFG has indicated that funds must be dedicated to direct mitigation/habitat conservation. Ms. Levin disagreed, stating the funds could be used for research to evaluate mitigation actions taken.

Jim Newman of CalWEA raised the topic of increasing the precision of predictions and/or analyses (e.g., 3.5 mortalities instead of 4). Mr. Stein noted that increased precision is only worthwhile if the results are likely to alter findings of significance and/or the extent of mitigation applied.

Regarding precision, Mr. Bloom mentioned that the 'poof factor' confounds results. Mr. Linehan replied that we know that wind projects affect raptors, but major impacts to passerines have not been shown at most project sites—unless one believes in the "poof factor." However, the poof factor has not been raised as an issue anywhere else in the country as an issue of concern—researchers believe they are in fact able to calculate passerine mortality (using appropriate scavenging and searcher efficiency corrections). He added that if the 'poof factor' idea appears to raise significant doubts about mortality estimates, perhaps it should be studied further to either get a handle on whether or not this impact occurs.

Ms. Rader cautioned the group to consider how high the bar is set for the wind industry as compared to other structures in California (e.g., smokestacks, communication towers etc). Mr. York assured the group that CEC holds all technical areas that CEC licenses to a very high standard. Mr. York agreed to provide information regarding other tower structures in response to Ms. Rader's request.

A question was raised regarding potential global warming affects on bird migrations, and the importance of tracking wildlife behavior in response to climate shifts. A participant informed the group that the EPA Office of Research and Developmental Environmental Assessment is starting a review of the effects of climate change on sensitive species, including birds (contact Dr. Michael Slimah at 202-564-3324 for details.) It was also suggested that a gap analysis could be conducted to assess existing research as a collective effort between the State, universities, etc.

5. *What pre-permitting study methods are most useful in aiding modern siting techniques?*

Ms. LeMay expressed her confidence in 20-minute point count data providing sufficient correlation factors between pre-permitting survey results and post-construction mortality data. This correlation factor is the one relatively consistent type of data industry can rely on to be accurate and cost effective. Until a similarly (cost) effective point of correlation can be established with a different study design, industry would rather continue to follow established protocols. She added it may be appropriate to invest money in researching other study methods before implementing them.

Jon Belak of EDM, Inc. noted that a study protocol (Morrison's 1998 Avian Risk and Fatality Protocol) calls for assessing rotor-swept areas in conjunction with 30-minute counts to help explore micro-siting issues and allows for exploration of alternate placements on the same site. Mr. Stein indicated that industry already does this; observing where birds are flying with respect to rotor-swept areas to capture behavioral risk as well as mortalities.

It was noted that habitat should influence the types of studies conducted. Mr. Anderson added that it depends on the question you want to answer. The displacement of birds is very different than the question of how birds move above vegetation in areas of risk.

6. *What techniques can be most readily compared to other pre-permitting studies in other states and elsewhere around the world?*

The following techniques were identified by various stakeholders:

- 20-minute point counts
- Breeding bird surveys
- Raptor nesting studies
- Habitat type-driven
- Point counts and transects are often used to assess breeding bird density, but some of these specific protocols are rarely used in wind protocols.

7. *Which species in California are known to be at greatest risk from wind development? What are the best ways to minimize risk to those species?*

Mr. Anderson stated that raptors are of the greatest concern in California; mostly due to Altamont. It is unclear whether other species are impacted to the same extent as raptors. While raptors are not the only species impacted, they are particularly prone to collisions. A question was raised regarding the relative significance of impacts when correlating mortality data with species abundance. The group was reminded that the topic of significance would be covered at a subsequent Staff Workshop.

Susan Sanders of CEC thanked the group for their thoughts and stated that the discussions were very helpful. She invited stakeholders to further expand upon these topics in written comments.

V. Pre-Permitting Migratory Bird Monitoring

A. Presentation: Migratory Birds in California, Assessing Migration Passage/Stopovers and Risk at Wind Sites – *Mike Green, USFWS*[3]

Mike Green initiated his presentation by stating he is not an expert on nocturnal migration studies, but as a member of SAC he wanted to review available information to provide points for discussion. Following is an overview of the presentation:

- Nocturnal bird biomass over California
  - Waterfowl, rails, herons/egrets, shorebirds and land birds

[3] A copy of the presentation can be found on the CEC website at http://www.energy.ca.gov/renewables/06-OII-1.

    - 4-10 billion moving north and south across North America
    - More present in fall than spring
    - No idea how many cross California, but likely on the order of 100s of millions
- Methods used to see them
    - Lights (including ceilometers and the moon)
        - Low-tech but useful
        - limited area lit
        - limited inference
    - Radar
        - weather/NEXRAD for general movements/direction/rate
        - mobile radar for data on horizontal and vertical planes; with complimentary imaging can distinguish between birds and bats
    - Acoustic: species distinguished by calls, arrays can determine speed and direction, useful for relative rates of migration
    - Thermal imaging: infrared, individual data for rate/height/direction, can distinguish between birds and bats, data intensive; requires terabytes of storage
- Pathways, landscapes, heights
    - Most data is from Midwest, East and the Gulf. We know they use stars and magnetic fields to navigate, prefer favorable winds, different pathways in fall/spring, they go to where food is on stop-over sites,
    - Data gap - radar data indicates that landforms don't clearly influence migration routes
    - Height
        - great variation reported from night to night
        - weather and seasonal variations
        - variation in landscape (compression over ridges, passes) may affect height
- Weather & Tower Lighting
    - Incidents of mortality events from unusual combination of winds and clouds
    - Sodium vapor lights (acting is ceilometers) rather than tower lighting could influence mortality.
- Recommendations for CA
    - Although little evidence of large mortality events at existing turbines, be wary of:
        - locations that hold clouds during migration months
        - North-south passes?
        - Geographical 'jump-off' points?
        - Strings in pathway of stop-over hot spots
    - If investigating – do it right
        - Combinations of radar & visual techniques; bird vs. bat
        - Season-long to capture variation
        - Measure passage rate below turbine height
        - Follow up with post-construction monitoring
- USGS-FWS-University collaboration – 2004 movements
    - Seeking unified support for varied projects across nation
    - Using AI to mine 7 years of NEXRAD data
    - Tracking migrants in the southwest with NEXRAD
    - Appalachians, SE, Offshore
    - Real-time information

B. Discussion Items

1. *What circumstances might require a detailed assessment of migratory bird passage?*
2. *What techniques are appropriate to quantify numbers and altitude of migratory birds?*

Mr. Zichella kicked off discussions by suggesting consideration be given to integrating general weather and military radar monitoring (NEXRAD, AWAX, etc.) with the monitoring of migratory bird behavior.

Mr. Newman then proposed environmental assessments should consider seasonal weather effects on migration, and that it could be possible to use short-term radar studies if patterns of migration were known; conducting studies at peak periods and extrapolating back to get at worst case scenarios.

Regarding the current state of knowledge of bird migrations, Mr. Green stated the following:

- More is known about Eastern and Mid-Western regions
- It is not known if western mountainous terrain creates greater variation in patterns than what is known about migration in the eastern regions.
- The assumption for California is that birds migrate in a broad front in the fall.
- In spring, birds are likely at lower elevations where food is present (insects).

Mr. Bloom suggested using Ms. LeMay's map to limit the scope of migration studies to specific (viable) areas rather than looking at the entire state. Mr. Stein inquired what the real utility of radar studies is if good post-construction mortality data exists. Mr. Green replied that radar studies may not be needed if it is known that you are not striking nocturnal migrants.

Mr. Linehan noted that radar has been used in a few locations in the West, and is fairly common practice on the East Coast, probably because wind energy is newer in the East, and there is less post-construction mortality data to rely on. Higher mortality has been observed in the Northeast; in some cases double that which is seen in the West. Findings do not indicate that birds follow ridges on the East Coast but do indicate that the vast majority of night migrants fly at heights well above the turbine swept area. Mr. Linehan commented that it seems likely that radar studies could be useful as a tool for research rather than as a long-term monitoring technology, given its expense and the lack of documented major passerine impacts to date at western wind projects

It was also noted that decades of NEXRAD radar data was collected at the Edwards Air Force Base. Mr. Linehan noted that NEXRAD has limited value; it allows you to look at relative bird use at various compass points equidistant to the radar—thus allowing a relative comparison of overall avian/insect traffic at a proposed site compared to other locations at similar distances from the NEXRAD radar. However, it doesn't give information about flight height nor can it distinguish birds versus bats (and sometimes can't sort out insects from birds). Mr. Green added that NEXRAD could be used at a known problem site(s) to predict when major migration movements occur to allow for shut downs in a real-time response.

Ms. LeMay raised the idea of focusing on migration altitudes; if a range of migration altitudes could be confirmed it could help inform a maximum tower height and rotor swept area. Other risk factors

(e.g., stop-over points, landing/take-off at dawn and dusk, etc.) could be assessed without radar once the altitude question is answered as these risk factors would be assessed during the day. Mr. Green countered that while dawn and dusk are important times for landing and take-off, these events occur at night as well.

Mr. Zichella expressed an interest in studying known stop-over points. It was noted that there are different stop-over points for different species; while waterfowl are fairly predictable, songbirds are not. Mr. Green stated we know birds concentrate in areas where food is present in the West. If a developer is considering building close to such a site, it may be appropriate to consider nocturnal migration studies. Mr. Zichella concluded that a very small universe of potential sites exists; therefore it is important to get the most useful data in an efficient manner by focusing on potential wind sites only.

3. *Would a map of bird migration corridors in California be useful in assessing risk?*

It was noted that if a map was created it should capture stop-over points.

In closing, Mr. De Morgan acknowledged the group's participation and efforts, highlighted some key areas of concurrence and provided a brief overview of the next day's agendas before adjourning the meeting for the day.

Tuesday, August 29, 2006

I. Introductions and Agenda Review

Mr. De Morgan welcomed all attendees, reviewed the ground rules and provided an overview of the day's agenda and objectives. He then turned to Ms. Sanders for a presentation on Operations Monitoring.

II. Operations Monitoring

A. General Overview Presentation – *Susan Sanders, CEC*[4]

- Purpose:
  - Compare information to pre-permitting fatality estimates
  - Evaluate the effectiveness of mitigation measures
  - Assess unanticipated impacts
- Development of a Program
  - Consider operations monitoring protocol during pre-permitting surveys
  - Coordinate with CDFG in developing protocol and duration
- Duration
  - Multi-year monitoring if high potential for bird or bat fatalities, substantial seasonal/annual variation, using adaptive management/testing mitigation effectiveness

[4] A copy of the presentation can be found on the CEC website at http://www.energy.ca.gov/renewables/06-OII-1.

    - Minimal monitoring if proposed project adjacent to existing facility, low bird and bat impacts, data recent and applicable to micro site and habitat conditions
- Bird and Bat Use Studies
    - Put fatality data in context of relative abundance
    - Assess changes in species composition/numbers
    - Characterize flight behavior, changes in use
- Factors to consider in Carcass Search Protocols
    - Search area
    - Frequency of searches
    - Corrections for searcher error and scavenger removal
- Factors to consider in Carcass Search Protocols
    - Determine search radius with pilot searches
    - Size of plot should vary with height of turbine, adjacent slope
    - Bats, small birds closer to turbine
- Search Frequency
    - establish with pilot scavenging trials, minimum every two weeks or more frequently if warranted and for projects with many turbine
    - stratify sampling
- Searcher Efficiency
    - variability due to inherent individual differences and changing field conditions; conduct searcher trials to correct for variability throughout monitoring period
- Scavenging Removal Estimates
    - plant carcasses and check daily at first
    - repeat scavenging trials throughout monitoring period.
- Sources of Bias in Removal Estimates
    - Background mortality
    - Scavenger learning, seasonal change in scavenger numbers
    - Inappropriate surrogate for carcass (e.g., domestic species, not freshly killed), inappropriate density of carcasses
- Metrics and Data Analysis
    - Number of fatalities per megawatt of installed capacity
    - Corrected fatality rate is observed rate divided by probability that carcass is available during a search and is found
- Monitoring Reports
    - Sufficient detail so reviewing agencies/peer reviewers can evaluate methods and check independently
    - Discuss effectiveness of mitigation
    - Public participation in development of monitoring programs, review of monitoring reports?

B. Discussion Items

The group engaged in the following general dialogue before honing in on the specific discussion items.

Mr. Stein suggested the group consider if protocols for operations monitoring should be different for repowering versus the development of a new project; clarifying he was not looking for an answer but was proposing something for consideration as the discussions unfold.

Mr. Newman informed the group that CalWEA prefers to institute a multi-year monitoring effort based on a particular facility's impacts. It is more useful to use a comparative analysis (e.g., higher than/lower than) when assessing a project's degree of relative impact. Given that there will always be some fatality for birds and bats, we need to determine when fatalities require different levels of mitigation and/or monitoring protocols. Ms. Sanders asked if the guidelines should include numbers or reference studies to provide context for relative determinations of high vs. low impacts. Mr. Newman suggested that the guidelines could set a qualitative threshold rather than establishing hard numbers. Mr. Anderson proposed that a range of examples of low and high impacts could be included, with a threshold falling somewhere in the middle. Over time, with feedback, an actual number for a threshold may be identified or agreed upon.

Mr. Zichella raised a concern that while Altamont has demonstrated significant impacts, it should not be assumed that all other sites will have a less-significant impact than Altamont and therefore not require sufficient monitoring of mitigation measures. If pre-permitting studies are not conducted, results cannot be correlated with operations data to get a clear picture of impacts. The goal is to make wind projects happen and to do it right. Data gaps exist and will not be filled before the guidelines are written. As such, a range of thresholds would be appropriate to include in the guidelines until we learn more through a gap analysis.

Ms. Rader commented that decisions about monitoring should be based on existing evidence. If evidence exists that shows an impact(s) below CEQA's level of significance, industry should not have to conduct more monitoring. The guidelines should not establish a range of arbitrary numbers; rather numbers should be developed for specific sites and based on good science. Mr. Linehan added that monitoring could help build a database of impacts from wind to inform developers up front for new projects. It was noted that government funds/conducts a great deal of research regarding nuclear energy and fossil fuels. Asking the wind industry to conduct monitoring at every site adds to overall costs and makes wind less competitive compared to other energy sources (with greater known impacts).

Samantha Murray of the San Francisco Audubon Society stated that a blanket protocol for all project sites is too hard to establish with confidence; protocols would need to vary site to site. The question of whether to conduct operations monitoring indefinitely or for a certain period of time should also be a site-specific determination.

Mr. Vercruyssen stated his belief that the most import element of the guidelines is pre-permitting monitoring to try to avoid impacts in the first place. Issues of mortality will not be completely resolved in the future, but we will get much better at making site-by-site predictions based on more extensive data as it becomes available. While we should not presume every project has the potential for major impacts, resources should be invested in saving the most birds possible for the amount of money spent early on in the process.

Mr. Bloom raised the issue of there being several definitions of significance and public perception of significance is important to note. For example, takings at Altamont violate acts of Congress (Migratory Bird Treaty Act and Bald Eagle Protection Act) which the public finds to be 'significant'.

Being sympathetic to wind industry getting hit by cost comparison and rate bases, Mr. Zichella suggested that the group may be able to draft ideas for (political) resource procurement to help

offset costs for research and monitoring. Mr. De Morgan suggested the group consider this topic as it relates to the mitigation section of the guidelines for further discussion at the next workshop.

Ms. LeMay raised the concern that if a 'threshold' for significance of impacts was included in the guidelines, you would need to establish different thresholds for different species. CEC staff responded that a threshold would only be used as an example for providing guidance to developers rather than a hard line requirement; it is intended to be helpful not inflexible and restrictive.

1. *What study techniques have been the most effective predictors of avian activity and mortality?*

Ms. Sanders noted that she was not sure there is an answer to this question, but that it merits some discussion. A participant mentioned that bi-weekly monitoring would not be sufficient as you could miss episodic events due to scavenging. Ms. LeMay stated that any studies which have provided answers should be considered, and mentioned that 20-minute pre-permitting point counts, correlated with carcass surveys post-construction, have been a very useful tool for wind industry.

Mr. Newman added that pre-permitting assessments can be focused on quality or quantity, but should be a function of the level of precision needed to validate predictions via operations monitoring.

2. *Are there any circumstances in which no operations monitoring would be required for a proposed wind energy site?*

Mr. Newman proposed that if you were repowering a project and both pre-permitting and existing operations monitoring provided confidence that mortality was within an acceptable range, additional operations monitoring would not be necessary. Mr. Zichella disagreed, stating he would want to see additional monitoring to assess the impact(s) of repowering itself. Mr. Newman noted that if the height of towers changed during repowering, you would need to see if the impact of the project changed as well.

Mr. Stein stated that circumstances could exist where operations monitoring would not be warranted and would bring very little value. For example, if one site had results from pre-permitting studies and post-construction mortality monitoring (per protocols acceptable to all and showing an acceptable or low level of mortality) and industry was proposing to develop new turbines on an adjacent property with the same habitat etc., there would be no reason to assume mortality will be different. Ms. Rader suggested that this situation should not be limited to only adjacent sites if there is enough information to be quite sure that impact(s) will not be significant; if the science supports it, additional monitoring should be avoided. The level of evidence needed to make this determination and how to define what constitutes an 'acceptable' correlation between different sites would need to be discussed. Another participant recommended that the Montezuma Hills site (e.g. High Winds) be considered as a great deal of operations monitoring was conducted there. Existing data from this site could possibly be correlated with other sites if initial studies showed substantial similarities between sites.

Peter Weiner, council for CEERT, noted that regulatory processes are always regulated with some degree of uncertainty and there will never be 'perfect' knowledge; therefore how much certainty is enough? If good pre-permitting monitoring is conducted and some level of certainty exists regarding

low levels of impacts, limited periodic operations monitoring may be sufficient. If operations monitoring is conducted it should be 'boxed' for cost predictability.

Mr. Newman cited an example of a site in South Dakota where the only pre-permitting monitoring conducted was a site reconnaissance to ensure that risk parameters were the same as at Buffalo Ridge to then assume the same predicted level of mortality. The only operations monitoring required was limited to whooping crane use. Mr. Newman suggested this could be a good example to consider. Ms. Sanders inquired if follow-up studies were conducted to assess if assumptions were accurate. Mr. Newman was not certain, but agreed to forward information offline to Ms. Sanders as possible.

3. *Under what circumstances might operations monitoring need to be continued indefinitely? At what point is there a diminishing return and limited wildlife benefit in continued studies?*

Mr. Linehan proposed that the intensity of monitoring should be determined by what questions you are trying to answer. For example, it would required less intense and expensive monitoring to ask the threshold question of <u>if</u> a project is causing substantial mortality. It would take more intense and expensive monitoring to correlate mortality with operations protocols and/or weather events. In Oregon, industry generally conducts monitoring for one year, but studies may be continued for a longer duration at a lower intensity driven by pre-permitting research results.

Mr. Green recommended indefinite periodic monitoring to account for bird use changes over time (e.g., every three or five years). Studies may not need to get into a great level of detail and complexity but cursory surveys could be conducted to get a feel for what is going on.

Mr. Linehan suggested that after formal monitoring has ceased, wind operations workers could be required to report mortalities, large events and anomalies for the life of the project . That type of on-going monitoring would address the desire for monitoring during the later years of project life that would identify if a significant or substantially anomalous event had occurred. This "Wildlife Reporting System" is standard practice at many projects in the PNW and is also required under the permit conditions for PPM's Shiloh Wind Project in Solano County..

4. *Is there a point at which the responsibility for post-construction monitoring should shift to a public rather than a private responsibility?*

Mr. Vercruyssen stated that industry is already conducting substantial operations monitoring, and there is a need to identify circumstances where it can be determined that enough is enough. Circumstances where money can be invested in more effective efforts should be explored, such as periodic long-term monitoring at minimal cost.

Mr. Zichella raised the concern that industry keeps raising the concern of exorbitant costs for monitoring, but the actual numbers do not appear to be all that large. He inquired what it would cost to conduct a standard, reasonable operations monitoring program; noting that scale does figure in, but estimates can be made to direct investigations of other sources of funding. Estimates could be rounded up to ensure funding procurement is sufficient. Brian Walton of SAC indicated that approximate costs could be calculated per staff, and then expanded to fit the scope of the research project.

5. *Are there circumstances in which monitoring reports should not be available to the public?*

The need to define 'monitoring reports' as well as to clarify the purpose for disseminating the information to the public was noted by Mr. Newman. If the overall purpose of monitoring is for research it would engender a different set of decisions; if the purpose is for compliance there would need to be a greater degree of protection regarding how and when the information was disseminated. In general, monitoring ought to be conducted and disclosed to the public once complete to preclude the public from jumping to conclusions.

A participant noted that in general monitoring reports should be shared. The more information that is centralized and available the better, but there are some analyses and terminologies that can be misconstrued. An agreed-upon and consistent method for analysis of data is needed.

Mr. Linehan stated that his company will generally share most of the data from pre-permitting and operations monitoring save for during the prospecting stages when they are competing with other developers (at which time only raw data is typically available anyway). Pre-construction survey results should always be public when permits are being prepared, and operations monitoring results should be shared with the public. Mr. Bloom expressed his opinion that there are no circumstances under which data should be withheld from the public as it creates a perception of withholding information. Mr. Linehan suggested the creation of an annual reporting schedule to avoid this perception.

Ms. Ward interjected a parallel circumstance when withholding information about the location of rare plants would be appropriate to prevent vandalism of sites. It may be appropriate in some circumstances to limit public access to monitoring reports to avoid the risk of poaching.

6. *Should monitoring reports include raw data (i.e., field data entered into a database such as Access)?*

There was general agreement among the group that this would be useful.

7. *Should wind energy sites offer some level of open access to outside parties for follow-up studies? Should the guidelines provide recommendations on how to develop agreements with project owners for such access?*

Ms. Rader noted her belief that such access should be provided if all parties support and have confidence in the science. Mr. Stein expressed a concern based on examples of how information was used in the past. As such, open access to outside parties could be acceptable with agreement on the scope of the study and an approach for how results would be disseminated. Mr. Zichella concurred but added it would be important for such an agreement to meet the needs of both industry and environmentalists, specifically to prevent industry from vetoing independent research projects that may indicate mortality.

Mr. Weiner commented that this discussion appeared to indicate a need for bilateral agreements and responsibility. He proposed a mitigation fund could support regular processes of periodic monitoring, but a decision needs to be made regarding when and where. A pre-development fund could be established that pays for follow-up studies, and a state-wide agreement and neutral process could be set up to make determinations about what kind of monitoring is done to limit problems associated with access. Mr. Anderson wondered if this could be done at the county or state level, then suggested this topic be flagged for discussion at the next Staff Workshop. In closing, Mr.

Linehan informed the group that Riverside County has a fund (the Wind Implementation and Monitoring Program) that is supposed to accomplish this goal but has not focused on avian impacts.

Ms. Sanders wondered if the guidelines should include recommendations regarding the development of agreements between researchers and land owners. Mr. Zichella suggested that the recommendations could assist in structuring an open and transparent process; possibly including some level of review (by CEC/DFG) of research proposals to evaluate their usefulness. Mr. Vercruyssen agreed that it would be good for research proposals to be vetted by a state agency and added that parameters could also be established about what research would entail before negotiations between researchers and developers to create a starting point for conversations.

Ms. Rader expressed her opinion that access is only a consideration when the State or someone else is funding research. Access should not be a function of guidelines, as resources should not be taxed for sites where there are clearly not significant levels of impacts.

Ms. Sanders inquired if models for how to conduct research on someone's property and how to use the results existed. There were no immediate responses to this question therefore Mr. De Morgan encouraged participants to respond via written comments as appropriate.

8. *Would a clearinghouse or centralized database of California wind/wildlife monitoring reports be useful? How should it be organized (by county? region?), and what agency would maintain it?*

There was general agreement among the group that a centralized database would be useful. Mr. Weller suggested pre-permitting and operations mortality data should be pulled together using a database and providing some kind of analysis to do so. Different methodologies create challenges, so there is a need for a minimum standard, which could be exceeded for regulatory compliance if needed.

Mr. Weiner suggested the State should preempt all local guidelines for monitoring and create uniform monitoring protocols for comparisons and transparency of data. All raw data with detailed accounting of assumptions built-in must be provided to be able to use the data effectively.

III. Bat/Wind Turbine Interactions

A. Presentation: Overview of Status of Bat/Wind Turbine Research and Study Methods – *Bronwyn Hogan, CDFG*

- The extent of information regarding interactions between bats and wind is similar to what was known about birds and wind interactions 10 years ago
- Documented cases of bat mortality across the county
- 2nd year monitoring at High Winds reported more bat mortalities than birds
- Fatalities and night activity are variable; night-to-night, seasonally, year-to-year
- Little data is available and research and monitoring protocols are not standardized so comparisons are difficult to make if not impossible
- Most fatalities are migratory tree bats (hoary bats) followed by Mexican free-tails, western reds and silver-haired bats

- Migration patterns in California are based on seasonal shifts in abundance, and pulse migrations
- Good baseline data is not currently available and must be developed
- Pre-permitting/site selection
    - Problem areas:
        - forested ridges on east coast have been a problem but don't know if the same holds true for California
        - along major river corridors
        - close proximity to know large roosts
        - perhaps along riparian edges/corridors
    - Canada developed pre-permitting monitoring protocols (Alberta Protocol) which detail precise and standardized methodology
    - Proposed monitoring goals:
        - determine species occurrence and diversity
        - activity levels
        - account for daily-seasonal-yearly variations
        - potential migration routes (if and where)
    - Linking pre- and post-construction data is very important; without this you cannot correlate real project-related impacts
    - Pre-permitting survey techniques:
        - acoustic monitoring (Anabat system recommended by Canada)
            i. greater upfront costs but can leave out year-round collection of data and follow up with more studies if needed based on results
            ii. looking at varied heights to increase detection range for acoustic devices
            iii. relatively inexpensive and many people can do it
        - radar
            i. very expensive
            ii. cannot discern bats/birds of comparable size right now
            iii. very few people available to do this work
        - thermal imaging
        - mist netting (limited height/reach)
        - long-term monitoring is important to deal with extreme variations but also to account for weather and other factors when correlating pre- and post-construction results
- Operations monitoring
    - Need to link to pre-permitting data
    - Need funding for research to establish baseline data
    - Carcass surveys
        - Daily searches found 3X's as much mortality as weekly searches, likely because bat carcasses get scavenged faster than birds
        - Do not use 'substitute' species
        - Test searcher efficiency and scavenging rates
        - Some locations are stratifying turbines (testing some daily, some weekly, some seasonally)
        - Develop a common denominator search interval to compare data
    - If possible, asses changes in site use, not just mortality rates
    - Data should be provided in sufficient detail with sufficient methodology to compare results elsewhere

B. Discussion Items

General discussions ensued before attention was turned to the specific discussion items as follows.

Mr. Sinclair requested a citation for the Canada's wind/bat guidelines (Alberta protocol). Betsy Bolster of CDFG replied that a draft of the protocol was loaned to CDFG but that it was not yet publicly available. Ms. Bolster informed the group that the California Bat Working Group will submit comments to the CEC/CDFG effort and include recommended bat/wind guidelines, patterned in large part on Alberta protocols, which may help in drafting guidelines. Mr. Sinclair asked if CDFG believed the Alberta protocol reflected state-of-the-art science; Ms. Bolster replied affirmatively.

Ms. Bolster offered that since the significance of relative bat mortalities is not known, more monitoring is justified. Ms. Hogan noted that there is evidence of significant scavenging of bat carcasses therefore you could miss a huge pulse event with infrequent carcass monitoring. She added that study sites could be stratified; with 1/3 monitored daily, 1/3 weekly and 1/3 monthly. Mr. Vercruyssen suggested that the guidelines should not establish a one-size-fits-all approach as there is so much uncertainty about impacts to bats. Ms. Hogan offered to compile a bibliography of studies conducted to help shape comparison studies.

Mr. Newman asked if the California Bat Working Group guidelines look at recommendations for siting and pre-permitting and operations monitoring and what the representation of the working group looks like. Ms. Bolster replied that the Working Group is primarily comprised of academics, researchers, agency biologists and biology consultants; while there are no industry representatives involved, the group is open to anyone. She clarified that the Working Group guidelines are not prescriptive but rather state what should be considered.

It was noted that a political argument could be made regarding the application of CEQA for all species of special concern present in an area. Ms. Hogan informed the group that none of the migratory bats are currently listed but the mastiff and Western red bats will be added to the list very soon.

A participant inquired what leads to listing of a species. Ms. Bolster replied that CDFG recently completed a status report on red bats; including a standardized CDFG methodology to inform additions of new species to the list. She offered to share this report with anyone interested upon request. Generally, listing decisions are 1) informed by old distribution records as compared to new records and 2) dependent on riparian habitat which is significantly declining.

1. *How applicable are bat/turbine studies from other regions for California?*

Mr. Linehan commented that his company has been doing projects with Bat Conservation International but we do not yet have a successful methodology to predict bat mortality. Conducting operations monitoring in the Northwest seems to be less important than in the East because the monitoring that has been done has shown lower bat mortality than in the East, but monitoring protocols in general depend on what questions you are seeking to answer. In the Northwest the company is asking if projects are killing large or small numbers of bats. Maybe less-intensive surveys

could be conducted in California (e.g., monthly or bi-weekly) to see if there is a substantial bat mortality problem, and then do more studies to characterize the problem if one is identified.

Mr. Stein suggested it is important to better understand what numbers of mortalities are significant to populations in addition to simply quantifying mortalities. Ms. Hogan stated that baseline population data does not exist but it is known that bats are slow to reproduce and are long-lived animals. Even if only a few mortalities occur each year it may have significant population impacts.

Mr. Walton wondered if the guidelines were going to suggest research methodologies or establish standards. How can significance be addressed when you do not have sufficient data for comparisons? Ms. Sanders replied that decisions must be made to keep projects moving forward using the best information available at this time. The guidelines will be revised as new information becomes available. Regarding how to decide significance of impacts to bat populations, Ms. Ward noted it would be a conflict of interest to suggest paths for research in the guidelines because SAC scientists could bid on them later; perhaps PIER could conduct a workshop on this topic instead.

2. *What features of a site might indicate that detailed bat studies would be required (e.g., proximity to known maternity colony).*

Ms. Hogan stated that bat activity is influenced by insect and water presence but it is unpredictable. Large pulses of activity have been detected along rivers and lakes but we have not looked for pulses along ridges. She noted that when comparing sites, significant bat mortality has been seen in locations without significant differences in topographic features. Mr. Weller suggested assessing changes in site use could get at whether or not turbines actually attract bats. He also proposed that maternity roosts may not be as important of a consideration as migratory routes.

3. *Would year-round pre-permitting acoustic be warranted at such sites, or only during peak migratory periods (August – October)?*

Ms. LeMay inquired if acoustic filters can be used to detect specific species. Ms. Hogan replied that computer software filters can identify up to 85% of calls based on established parameters; this analysis requires knowledge of which bats are present and parameters for each of their species-specific calls. Mr. Weller added that you could apply two different metrics for either total bat activity or presence of individual species. Some calls are easier to discern from others, and pulses of calls may help identify potential migratory routes. A participant noted that wind noise created empty acoustic files at their study site, a proposed wind turbine development in Plumas County, indicating analysis of acoustic data may not necessarily be a small investment.

A participant asked if there were ways to use acoustic data in a BACI framework. Mr. Weller replied that you could establish a control site to measure acoustics and compare results with a treatment site. Statistical problems could be avoided if you stated you were measuring presence not abundance.

Ms. Hogan informed the group that technology does exist to conduct long-term, pre-permitting monitoring to get a sense of daily bat activity, with costs for one AnaBat system with an external battery and a solar panel costs totaling approximately $2,000/unit plus labor. It was noted that AnaBat systems could be re-used at different sites as well. Mr. Linehan then outlined an example of costs for a 30 megawatt project as follows:

- Four AnaBats were used to collect data for one year of pre-permitting studies = $85,000

- Operations mortality surveys and continuing AnaBat surveys will be conducted for two years = $215,000
- 1/3 of the funds were provided by developers and 2/3 by public interest groups and others.

Mr. Walton stated that many of the concerns for bats are almost the same as for birds and that investment in pre-permitting surveys could avoid mitigation costs later. Results are very hard to predict given the limited information available so very rigorous, site-specific data collection should be conducted up front. Ms. Hogan replied that while pre-permitting monitoring is important, both pre-permitting and operations monitoring are needed to correlate data and assess actual impacts.

Ms. Rader mentioned that the technology/techniques to do cost-effective studies do not exist right now, which leads to the question of what level of monitoring would be adequate. Ms. Hogan replied that we can not say with confidence that searching every three days is adequate (as compared to daily searches in an ideal world). Instead protocols should be established to compare different search intervals and data collected.

Mr. Vercruyssen inquired if and how larger population studies could be conducted. Mr. Walton replied that no one knows how to do this and the Migratory Bird Treaty Act (MBTA) accounts for individual birds because of this problem. Mr. Vercruyssen wondered if it was worthwhile to try to characterizing bat populations or if there were better ways to spend money to save more bats, especially in the earlier stages of development. Mr. Weller suggested that at this time population level surveys would be a waste of time, but pre-permitting studies could be conducted to try to predict mortality.

Ms. Rader expressed the concern that with no basis on which to make informed decisions, a threshold cannot be established to inform decisions on where to locate turbines and how to mitigate impacts to bats. Ms. Hogan noted that the situation was frustrating for everyone, but the hope is to standardize protocols for surveys conducted in the future so that data can be combined to draw conclusions between pre-permitting and operations monitoring results, as well as across sites.

Ms. Hogan expressed her opinion that focusing on fall migration alone for pre-permitting monitoring would not be sufficient. Upfront costs are large enough that long-term monitoring would not significantly increase overall costs. Mr. Weller added that different routes and timing of migration for regions of California also need to be considered. It was suggested that an intensive cooperative study be conducted in combination with basic studies at all sites to get at baseline data.

IV. Open Discussion

Time was allocated at the end of the workshop to further discuss agenda topics as well as any 'new' topics which arose throughout the course of all discussions.

The discussion of whether or not conducting environmental site studies earlier in the development process would add value was revisited. It was clarified that there were two questions embedded in this inquiry: 1) can the permitting process (and studies) start sooner and 2) would additional information about a region/territory expedite the permitting process? Ms. LeMay noted that if it was known that Swainson's hawks migrated 10 miles to the west of a site and that they migrated earlier in the year, this information could preclude a few months of surveys. Ms. Rader commented that Kern County is identified as a site for major megawatt development in the future and that

conducting a CEC-funded regional study (e.g., Kern County) could be helpful. Mr. Newman suggested that a programmatic impact statement could help hone in on information needed and what data should be collected; the Bureau of Land Management (BLM) Programmatic Environmental Impact Statement (to evaluate the impacts of wind energy development on Western public lands) could be reviewed as an example (see http://windeis.anl.gov for more information). USFWS issued a biological opinion in response to this EIS, stating there would not likely be general biologically-significant impact(s) in this region, but that incidental takes would have to be developed for impacts to specific ESA-listed species.

The topic of resources for research was raised again and Mr. Zichella suggested the group lobby for resources and find creative sources of funding. It was noted that the latter is the only option that could be considered for inclusion in the guidelines. Mr. Vercruyssen asked if CEC staff could enumerate the current sources of funding available; not as part of the guidelines but rather in support of the guidelines. Mr. York replied that it would be possible to do so without stating preferences for any. Ms. Ward added that while it is possible, it is unlikely that staff would have sufficient time to do so right now. A participant informed the group that PIER has a road map for identifying funding sources and suggested that written comments could include lists of any existing opportunities that stakeholders are aware of.

Ms. Hogan inquired if there was some mechanism to develop a research co-operative out of this process. Mr. York responded that PIER would be a more appropriate venue to address this topic. PIER is looking at gaps in research and will host their own workshops; focused first on scoping the issue and then developing a roadmap.

Conversations turned to whether or not a clearinghouse or centralized database of California wind/wildlife monitoring reports would be useful. A clearinghouse of data would be useful, according to Ms. Hogan, but the question remains of who would maintain it if not CEC. Mr. York stated that this issue would be discussed further at a future workshop(s). Mr. Weiner suggested the focus be on gathering data with the goal of increasing our understanding and decreasing cost, and expressed the hope that the CEC mission can encompass the research aspect. He requested that the Commission clarify whether or not this is within its scope; and if not can they change their mission. Ms. Ward replied that PIER was designed to handle all aspects of research. Mr. Weiner clarified that he was thinking not about specific research but about the interactions associated with research. Ms. Ward confirmed that this is being done but in different departments within CEC; driven by the integrated energy policy report. PIER is the place to work on developing a roadmap for finding research funding. Mr. De Morgan noted that it appears stakeholders should continue conversations by participating in future PIER workshops.

A participant stated that a clearinghouse would be useful and should include more than just monitoring reports. Ms. Ward said that the Bio-geographic Data Branch of the CDFG has a web-based information system, and that there was some interest in housing data there. Mr. York inquired if there were suggestions for other places to house this information. Scott Flint of CDFG replied that a clearinghouse of research information and/or monitoring reports was not likely to be hosted by CDFG, but that biological data acquired throughout the pre-permitting process would be a possibility. CESA-related files and reports would be kept but CDFG would not automatically track information at all sites. Ms. Ward suggested that a non-profit could host the information. Ms. Sanders stated that the form of the database would depend on who the users would be. If primarily used by counties, the focus should be on pre-permitting monitoring followed by operations

monitoring. If primarily used by researchers, something similar to the NWCC model would be better. In the interest of time, participants were encouraged to include any additional thoughts related to this topic in their written comments.

The question was raised of whether the guidelines should establish expectations for monitoring reports, and if so what would the expectations be? Should a distinction be made between metrics and methodologies versus common elements? Ms. Sanders stated that the Army Corps of Engineers has produced helpful mitigation and monitoring proposal guidelines for development of wetland mitigation plans, and that CEC could develop a similar suggested template for monitoring reports as an appendix to the guidelines. Ms. Ward added that comparability is very important.

V. Next Steps

Stakeholders were reminded of the following opportunities for public input:

- September 8 - written comments on today's workshop discussions are due.
- September 15 - written comments regarding the next Staff Workshop (including proposed agenda topics, start/end times to accommodate travel plans, meeting documents and presentation topics) are due.

The group was reminded that PIER will be hosting a meeting in October in support of the development of a research roadmap.

Staff Workshop #3

- Two days during the last week of September *(currently scheduled for the 28th-29th but may adjust the dates if needed)*
- Day 1 from 10:00 am – 5:00 pm *(tentative)*
- Day 2 from 8:00 am – 3:00 pm *(tentative)*
- Located in Kern County
- A draft agenda will be distributed approximately one week in advance

CEC staff inquired if participants had suggestions for a venue in Kern County. It was suggested CEC talk to Kern County staff to see if location would influence their attendance, and to inquire if county offices/planning department have meeting rooms available. It was noted that Burbank would be more convenient for other travelers and that folks from San Gorgonio and advocates from Los Angeles may participate too. Stakeholders were encouraged to share any additional thoughts with CEC staff as soon as possible. CEC agreed to strive to confirm the dates and venue location informally via email by next Tuesday, September 5.

The group proposed the following agenda topics for the September Staff Workshop:

- Summarize key points already covered and encourage written input from 'new' county attendees
- Guidelines revision process *(from Bin List)*
- Impacts
    - CEQA Significance
    - What data you need and how to use it?
    - (In)direct/ known/cumulative impacts
    - Displacement
    - Interpreting level of impacts

    - Which impacts are most important and of the greatest concern?
    - CDFG determinations of impacts (types, significance, how to use information to describe compliance with other laws, determine of risk and risk modeling and risk determination in data analysis.)
    - NWCC White Paper on risk assessment
- Consider consultant presentation on risk analysis
- Mitigation (including concept of a research fund)
- What are the guidelines aimed at? (CEQA? MBTA? Other?) Are they really voluntary?
- Correlations between sites and the use of existing data
- Consider consultant presentation on risk analysis
- Access to sites for continued research

Ms. Ward encouraged participants to send additional agenda topic suggestions to Mr. York via email as soon as possible rather than waiting for the official release of the workshop notice. She requested that agenda item suggestions be either 1) phrased as a question or 2) discreet agenda topics including a brief paragraph description for each. Stakeholders are also welcome to request the opportunity to share a presentation of their own; if so, please indicate the subject matter and the amount of time needed.

August 28-29 California Energy Commission Avian Guidelines Workshop Attendees

Dick	Anderson	Science Advisory Committee
Jon	Belak	EDM International, Inc.
Jennifer	Bies	RESOLVE
Pete	Bloom	Bloom Biological
Greg	Blue	EnXco
Betsy	Bolster	California Department of Fish and Game
Matt	Caldwell	California Energy Commission
John	Day	Santa Barbara County
Paul	De Morgan	RESOLVE
Scott	Denny	Kern County
Melinda	Dorin	California Energy Commission
Scott	Flint	California Department of Fish and Game
Michael	Green	US Fish and Wildlife Service
Bronwyn	Hogan	California Department of Fish and Game
Jennifer	Hogan	California Department of Fish and Game
Golam	Kibrya	California Energy Commission
Brenda	LeMay	Horizon Wind Energy
Julia	Levin	Audubon Society
Andy	Linehan	PPM Energy
John	Mathias	California Energy Commission
Jim	Newman	Pandion Systems, Inc.
Dan	Pearson	Southern California Edison
Nancy	Rader	California Wind Energy Association
Paul	Richins	California Energy Commission
Susan	Sanders	California Energy Commission
Mark	Sinclair	Clean Energy States Alliance
Paul	Spaulding	California Energy Commission
Linda	Spiegel	California Energy Commission
Kenny	Stein	FPL Energy
Dave	Sterner	California Department of Fish and Game
Paul	Vercruyssen	Center for Energy Efficiency and Renewable Technologies
Joe	Vincenty	California Department of Fish and Game
Jim	Walker	EnXco
Brian	Walton	Santa Cruz Predatory Bird Research Group
Misa	Ward	California Energy Commission
Peter	Weiner	Paul Hastings (Counsel for CEERT)
Ted	Weller	USDA Forest Service
Kerry	Willis	California Energy Commission
Marcus	Yee	California Energy Commission
Rick	York	California Energy Commission
Carl	Zichella	Sierra Club